

Efficient literature review and evidence mapping

Week 3 · 2105620 Research Communication Skills for Chemical Engineers

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TODAY

Three hours, at your own keyboard

10 min	Why a pile of papers is not a review
8 min	Laptop check — open Zotero now
22 min	The search as a reproducible object
15 min	Activity 1 — build a search you could publish
10 min	Break
35 min	Zotero laboratory — capture, repair, organise, cite
15 min	Screening in two passes
15 min	Activity 2 — the evidence matrix
10 min	Break
20 min	Reading a gap out of the matrix
10 min	Assignment 1 · Week 4 is a video

A literature review is not a pile
of papers you have read.

**It is a map of claims,
and the evidence for each one.**

Week 1: a list of papers is a bibliography. Today you build the thing that makes it a review.

What the map buys you



You stop re-reading

A paper you have mapped is a row you can consult. A paper you have only read is one you will open again in six months and re-read from the start.



Disagreements surface

Two rows, one column apart. This is the single most common source of a real research question.



Empty columns are findings

If nobody reports a quantity, that is not a hole in your reading. It is a hole in the field.

Everybody open Zotero. Now.

1

Open the desktop app

If it is not there, install it now from zotero.org/download while I talk

2

Open a journal page and look for the connector icon

In the browser toolbar. No icon: zotero.org/download/connectors

3

Raise a hand if either one failed

We fix it now, not at eleven-ten

The search

A search is not something you do. It is something you write down, so that somebody else can run it and get your number.

Three blocks, joined by AND

1

Material or system

What the work is made of, or acts on — the anode, the membrane, the catalyst, the feedstock

2

Process or phenomenon

What happens — dendrite growth, deactivation, fouling, selectivity, corrosion

3

Property or metric

What is measured — cycle life, coulombic efficiency, conversion, permeance

The synonym you did not think of

- **Spelling**

sulfur / sulphur · aluminum / aluminium · these are different searches

- **The older name**

What the material was called before 2015. Reviewers who are older than you use it

- **Abbreviation and expansion**

Both. “SEI” and “solid electrolyte interphase” do not retrieve the same set

- **Trade and systematic names**

Nafion and perfluorosulfonic acid. One is in the title; the other is in the methods

Four operators, and where they apply

AND OR NOT

Use **NOT** sparingly. It removes papers you have not seen, and it removes them silently

"exact phrase"

Quotes make a phrase one unit. Without them you get the words anywhere, in any order

dendrit*

Truncation catches dendrite, dendrites, dendritic. Truncating too early catches too much

Field limits

Title / abstract / keyword. The single most effective way to cut a result set without losing relevance

Write the search down like a result

Scopus · searched 20 Aug 2026 · TITLE-ABS-KEY((“zinc anode” OR “Zn anode”) AND (dendrit OR “dendrite suppression”) AND (“cycle life” OR “coulombic efficiency”)) · 2015–2026 · articles and reviews only · **412 hits***

Five things, every time: database · date · the full string · the filters · the number of hits.

ACTIVITY 1 • 15 MINUTES • YOUR OWN TOPIC

Build a search you could publish

Eight minutes building and running.

Seven minutes reporting.

Use your own research question. Not a made-up one.

What to do

1

Split

Your question into three blocks. Material · process · metric

2

List synonyms

At least three per block. Include the ones you would not use yourself

3

Run it

Record the hit count

4

Refine once

One filter only — date, document type, or title/abstract/keyword. Record the new count



10

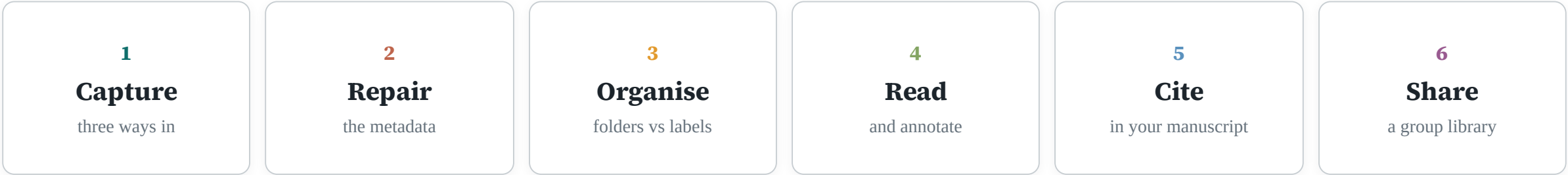
minute break

Come back with Zotero open. Anyone still stuck — come and find me now.

Zotero

Six moves. Do each one on your own machine as I do it.

Six moves



Three ways in



The connector

On a journal page, click the toolbar icon. Takes the record and usually the PDF.



Drag a PDF in

Zotero tries to identify it. Sometimes it cannot — see move 2.



By identifier

DOI, ISBN, PubMed ID, arXiv ID, ADS
Bibcode. Several at once, separated by spaces or
line breaks.

The third one is the fastest and the most accurate. Almost nobody uses it.

A library full of broken metadata
**produces a broken bibliography —
and you find out the night before.**

Move 2. The five most valuable minutes in this session.

Folders and labels are not the same thing



Collections

Folders. A paper sits in one. Organise these **by project** — one per chapter, one per manuscript.



Tags

Labels. A paper can carry five. Organise these **by claim type** — [method](#), [contradicts-X](#), [key](#), [to-read](#).

Cite, then change your mind

- **The plugin is already installed**

Bundled with the app. It appears in Word and LibreOffice the first time you launch Zotero — there is nothing extra to download

- **Google Docs works too**

But through the browser connector, not the bundled plugin, and Zotero must be running

- **LibreOffice needs Java**

A JRE or JDK. This is the single most common setup failure

- **Then switch the style**

One menu. Every citation and the whole bibliography reformat

What it costs, and what it does not

Free

Data syncing — items, notes, tags, links.
Unlimited, on a free account.

300 MB

File storage free, then paid tiers. PDFs are files.
This is the limit you will actually hit.

Groups

Free, no limit on members. Only the **owner's**
quota is charged for group files.

So: sync your library everywhere for nothing. If you also sync every PDF, you will fill 300 MB and have to decide.

One warning about plugins

Zotero itself does not maintain a plugin list, and its own documentation says plugins have **full access to your Zotero and your computer**, so install only from developers you trust.

Third-party plugins also break when Zotero updates — and it now ships a new major version every six to ten weeks. Useful ones exist. None of them is required for anything in this course.

Two passes, and the criteria come first

1

Write the criteria before you read

What makes a paper in-scope. Two or three lines, written down before you open anything

2

Pass 1 — title and abstract

Seconds each. In, out, or unsure. Never read the full text in this pass

3

Pass 2 — full text, only the survivors

And record why each exclusion was excluded, against a criterion

The evidence matrix

Four abstracts. One row each.

Then find where two of them disagree.

The four abstracts were written for this exercise. They are not real papers — do not cite them.

One row per paper

Claim	What the paper says is true — in one sentence, not a summary
System	Material, electrolyte, cell format
Conditions	Current density, depth of discharge, temperature, cycle count
Metric	The number, with its units. If none is given, write none
Limitation	What the authors themselves admit



minute break

Then: what your matrix is actually telling you

Three gaps, three shapes

Two rows contradict	An unresolved question	“Reports disagree on whether ... under X the effect is ..., whereas under Y ...”
A column is empty for every row	Nobody has measured it	“No study to date reports ... under ... conditions”
Every row shares one condition	The field has tested one regime only	“Existing work is confined to ...; behaviour under ... remains uncharacterised”

“Not much work has been done on X”
is none of those three.

That is an absence.

A gap is what the absence costs us.

Week 1, sentence 2. Most of you could not finish it. This table is how you finish it.

Assignment 1 · critical appraisal

1

One paper from your own area

Chosen by you. Plus at least three neighbouring papers

2

An evidence matrix

Your paper and the three others, one row each

3

600 words

What it claims · what evidence supports it · what the matrix shows is missing

4

The AI-use declaration form attached

This is the first assignment it applies to

Week 4 is a video

- 1 Week 4 is pre-recorded**
27 / 30 August. I am away. The video goes up before the session and Prof. Supareak runs the room

- 2 Bring the same paper**
Week 4 takes a whole paper apart. Bring the one you chose today, printed

- 3 Finish your matrix**
Four rows. It is the spine of Assignment 1 and of Week 5

You are not looking for papers.

**You are building the evidence
for a claim you have not made yet.**

See you in the video.

BEFORE YOU GO · 45 SECONDS

How was today?

Five questions. Anonymous — no name, no email, no login.

The fourth question is the one I actually use.

The two most common answers open next week's session.

oxidized-challenge-ed9.notion.site



Scan now — I will wait